

Application No. 10/594,652
Amendment Dated: July 14, 2010
Reply to Office Action Dated April 14, 2010

Remarks

Claims 1 and 3-31 are pending.

Claims 1 and 3-31 stand rejected.

Claims 32 and 33 are added.

Claims 1 and 3-33 are submitted herein for review.

No new matter has been added.

In the Office Action, the Examiner has continued the rejection of independent claim 1, under 35 U.S.C. § 103(a) as being unpatentable over Tsukuda (U.S. Patent No. 6,946,029), providing the response to arguments on page 4 of the Office Action. Applicant respectfully disagrees and submits the following remarks in response.

The present independent claim 1 is directed to a method of fabricating at least one polycrystalline silicon plate with one of its two faces presenting predetermined relief. The method includes depositing a layer of polycrystalline silicon on at least one of the two faces of a support, the support being a carbon tape. The face of the support is embossed to impart thereto a shape that is complementary to the relief. The polycrystalline silicon layer is deposited on the embossed face of the support, the surface of the polycrystalline silicon layer situated in contact with the embossed face then taking on the shape of the relief. The polycrystalline silicon layer is

cut up and the support is eliminated in order to obtain the polycrystalline silicon plate.

New independent claim 32 further includes the clarifying language that the depositing step results in carbon tape having two layers.

As noted in the prior Amendment, the presently claimed method is used in the texturing of polycrystalline silicon plates used in photovoltaic applications. See paragraph [0007]. The present arrangement allows for texturing polycrystalline silicon layers in order to fabricate solar cells, and is particularly advantageous for layers of small thickness, less than 300 μm .

The prior art techniques present limitations that are severe, either in terms of cost (electrochemical etching, plasma etching, and mechanical etching), or in terms of effectiveness (acid chemical etching) on very thin applications. See paragraph [0012].

On the other hand, the presently claimed arrangement reinforces the stiffness of thin silicon plates. The present invention solves the problem of embossing polycrystalline silicon plates, in particular of small thickness, less than 300 μm , by using a method that is less expensive than prior art methods, and effective since it does not disturb the internal structure of the silicon, and since it can be implemented industrially. See paragraphs [0014] -- [0015].

In the Office Action, in maintaining the rejection over Tsukuda, the Examiner did not give any basis to show that the silicon sheet is deposited on a carbon tape support. Applicant asserts that such an element, as claimed in independent claims 1 and 32, is not shown in Tsukusda.

Tsukuda describes a silicon sheet (40) produced from a base/roller (1) with protrusions (2) (Fig.1, and col.16, lines 28-30). More particularly, the roller has on its peripheral surface

protrusions as well as a cooling system for cooling the protrusions is rotated and the surfaces of the cooled protrusions are dipped into a melt material containing silicon materials to form crystals of the material on the surfaces of the protrusions. Thus, a sheet of silicon formed of the material is produced (ie. a one-layer sheet is formed).

Figure 34, and accompanying description of Tsukuda, shows a process of preparation of a silicon sheet (40) without mentioning any carbon tape support. The sole "support" in Tsukuda is the roller with protrusions. However, the rollers are used to emboss the layer of silicon and cannot be consider as being a tape on which the silicon is deposited. And even if the protrusions can be coated with a material of at least one of silicon carbide, boron nitride, silicon nitride, and pyrolytic carbon, they cannot be assimilated to a tape support, the latter being part of the final product before the eliminating step in claim 1

As such, Applicant respectfully submits that Tsukuda reference does not teach all of the elements of claims 1 and 32. For example, there is no teaching or suggestion in Tsukuda that describes depositing a layer of polycrystalline silicon on at least one of the two faces of a support, the support being a carbon tape where the face of the support is embossed to impart thereto a shape that is complementary to said relief.

For at least these reasons, Applicant submits that the prior art does not show all of the elements of claims 1 and 32, and respectfully requests that this rejection be withdrawn. As claims 3-31 depend from claim 1, the rejection of these claims should be withdrawn for at least the same reasons.

Regarding new claim 33, this claim includes all of the features of claim 1 and additional

includes the feature of dependent claim 3, namely a protective coating of pyrolytic graphite being applied to the support after its surface has been embossed in order to impart thereto the shape complementary to the relief. See original claim 3 and paragraph [0024].

Among other features, one of the technical problems addressed by the present application is to find a method of fabricating at least one polycrystalline silicon tape, in particular of small thickness, less expensive than prior art, and effective since it does not disturb the internal structure of the silicon and since it can be implemented in industrially (paragraph [0015]).

The technical effect of present arrangement as claimed in claim 33, is that the method allows to texture the face(s) of the silicon plate and/or mark the silicon layer with a reference and/or increase the stiffness of silicon plates (paragraph [0021]) from the carbon tape embossing, this method being realized in avoiding the silicon carbide formation between the carbon tape and the molten silicon (paragraph [0047]), and in allowing the eliminating of the carbon tape in order to access to the two faces of the silicon layer.

Applicant notes that although claim 3 is rejected under 35 U.S.C. § 103(a), the Examiner in pages 2-3 of the Office Action does not specifically point to a particular passage of Tsukuda to form the rejection of claim 3. In any event, Applicant submits that Tsukuda describes a completely different method as already explained above, and does not disclose the claimed arrangement of a step of "covering said support [i.e. "carbon tape"] by a protective coating of pyrolytic graphite after its surface has been embossed in order to impart thereto said shape complementary to said relief" nor does Tsukuda describe a step of "eliminating, in addition to said support [i.e. "carbon tape"], said protective coating in order to obtain said silicon plate."

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For at least this additional reason, Applicant submits that the prior art does not show all of the elements of claims 3 and 33, and respectfully requests that this rejection be withdrawn. As claims 8 and 13 depend from claim 3, the rejection of these claims should be withdrawn for at least the same reasons.

In view of the foregoing, Applicant respectfully submits that pending claims 1 and 3-31 are in condition for allowance, the earliest possible notice of which is earnestly solicited. If the Examiner feels that an interview would facilitate the prosecution of this Application he is invited to contact the undersigned at the number listed below.

Dated: April 14, 2010

Respectfully submitted,

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